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MINISTRY OF AGRICULTURE, FISHERIES AND FOOD

FOOD STANDARDS COMMITTEE REPORT ON COPPER

Revised Recommendations for limits for copper content of foods

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FOOD STANDARDS COMMITTEE

The Food Standards Committee was appointed by the Minister of Food in 1947 with the following terms of reference:

To advise the Ministers of Food and Health and the Secretary of State for Scotland as to the provision to be made concerning the composition of foods (other than liquid milk) and the labelling or marking of any foods for which such provision is made, by:

(a) Statutory Orders under the Defence (Sale of Food) Regulations; or
(b) Regulations (other than Milk and Dairies Regulations) under the Food and Drugs Acts, and corresponding enactments relating to Scotland;

for preventing danger to health, loss of nutritional value or otherwise protecting purchasers.

The members of the Food Standards Committee are:

Norman C. Wright, Esq., C.B., M.A., D.Sc., Ph.D., F.R.I.C. (*Chairman*).
G. G. Barnes, Esq., C.B.E. (*Vice-Chairman*).
C. A. Adams, Esq., C.B.E., B.Sc., F.R.I.C., Barrister-at-Law.
N. R. Beattie, Esq., M.D., D.P.H.
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A. J. Howard, Esq., M.A., F.R.I.C.
J. M. Johnston, Esq., M.D., M.R.C.P.E., F.R.C.S.(Ed.), F.R.S.E.
G. W. Monier-Williams, Esq., O.B.E., M.C., M.A., Ph.D., F.R.I.C.
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G. Taylor, Esq., O.B.E., F.R.I.C.
R. F. Tyas, Esq.
R. Wright, Esq., B.Sc., A.R.C.S.

Joint Secretaries:
M. D. M. Franklin, Esq.
W. M. Shortt, Esq., M.Sc., F.R.I.C.

METALLIC CONTAMINATION SUB-COMMITTEE

The Metallic Contamination Sub-Committee was appointed by the Food Standards Committee in October, 1948, with the following terms of reference:

A. To consider the available evidence in regard to:
   (i) The effect of the ingestion of foods contaminated with metals or other injurious elements.
   (ii) The technological problems which might arise from the prescription of limits for such contamination.

B. To advise:
   Where the evidence is sufficient to justify the recommendation of limits for any metals or other injurious elements, what these limits should be and whether they should be applied to foods generally, to any particular food or group of foods.

C. Generally to make proposals which may assist the Food Standards Committee to make recommendations, or to institute any further investigations which may be required.

The members of the Metallic Contamination Sub-Committee are:

G. G. Barnes, Esq., C.B.E. (*Chairman*).
Professor S. J. Cowell, M.B., F.R.C.P.
J. M. Johnston, Esq., M.D., M.R.C.P.E., F.R.C.S.(Ed.), F.R.S.E.
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G. Taylor, Esq., O.B.E., F.R.I.C.

Secretary:
M. D. M. Franklin, Esq.

FOOD STANDARDS COMMITTEE REPORT ON COPPER

Revised Recommendations for Limits for Copper Content of Foods

The Food Standards Committee have considered and approved a revised Report by their Metallic Contamination Sub-Committee in respect of the limits of copper in foods. The revised Report, which takes account of representations received from trade and other interests following issue of the Sub-Committee's Report dated 30th June, 1951, is in the following terms:—

1. Copper differs from the majority of trace elements in that it is a physiological constituent of plant and animal life. In plants it plays an important part in cell respiration; in the blood of vertebrate animals the formation of haemoglobin cannot take place unless traces of copper are present. On the other hand copper is an active oxidation catalyst and if present in milk or butter to the extent of about 2 parts per million (p.p.m.) it activates a form of breakdown in the fat thereby imparting a tallowy flavour and impairing the keeping qualities of butter; copper accelerates the destruction of ascorbic acid; copper salts in quite small amounts inhibit the action of digestive enzymes; and inorganic copper compounds are highly toxic to unicellular organisms such as algae.

2. It is not possible to say with any precision what is the amount of copper required daily by the human organism but the information at our disposal suggests that the daily amount required by an adult is from 1 to 2 mg., a quantity which would usually be supplied in a normal diet.

3. At the other extreme when copper salts are present in excessive concentration they are strongly astringent and irritating to the stomach. The medicinal dose of copper sulphate other than as an emetic is from 16 to 120 mg. The existence of chronic copper poisoning has not been established. In the light of present knowledge it is not possible to assess the risk to health which may arise from the consumption of foods with an unusually high copper content. The presence of quite harmless amounts of copper can, however, render many foods and beverages unpalatable.

4. Our primary concern is to protect the consumer against the sale of foods with a copper content greatly in excess of the nutritional needs of the human organism. This hazard is not likely to arise unless food is processed under conditions conducive to copper contamination; verdigris could, for example, be a serious source of contamination.

5. It will be apparent that, from the public health standpoint, copper is in a different category from arsenic and lead, and we are satisfied that the consumer will be adequately protected if limits consistent with good commercial practice are observed.

6. In arriving at limits for the copper content of food and beverages we have reviewed analytical data from the Government Chemist, the British Food Manufacturing Industries Research Association, the Port Medical Officers of Health, the National Association of Cider Makers, the Institute of Brewing and food manufacturing firms.

7. We have found it convenient to recommend general limits of copper content for (1) beverages, (2) other foods and to schedule a number of beverages and other foods to which these limits cannot at present be applied.

8. For beverages ready-to-drink we recommend that a limit of 2 p.p.m. copper should in general be observed, but consider that higher limits will for the present be necessary for the beverages specified in paragraph 10.

9. For other foods, with the exception of those for which higher limits are provided below, we recommend a general limit for copper of 20 p.p.m.

10. The following are particulars of the foods and drinks which cannot be brought within the general limits, and the special limits recommended for each:—

Article of Food	*Limit recommended in parts per million by weight*
(i) *Beverages:*	
Wines, beer, cider, non-alcoholic beverages prepared from cider, and concentrated soft drinks (not including concentrates used in the manufacture of soft drinks)	7 p.p.m.
(ii) *Other Foods:*	
Chicory—dried or roasted	30 p.p.m.
Cocoa powder	70 p.p.m. on the *fat-free* substance.
Coffee beans	30 p.p.m.
Colourings	30 p.p.m. on the dry *colouring matter*.
Flavourings	30 p.p.m.
Edible gelatin	30 p.p.m. (already prescribed).
Pectin—liquid	30 p.p.m.
Pectin—solid	300 p.p.m.
Tea	150 p.p.m.
Tomato ketchup	50 p.p.m. on the dried *total* solids (already prescribed).
Tomato puree, paste, powder, juice and cocktails.	100 p.p.m. on the dried *tomato* solids.
Yeast and yeast products	60 p.p.m. on the dry matter.

11. Some of these items call for comment:—

(1) The limit recommended for concentrates used in the manufacture of soft drinks is 20 p.p.m.

(2) The limit recommended for food colourings is without prejudice to any recommendations which may be made by the Preservatives Sub-Committee of the Food Standards Committee.

(3) *Pectin.* The manufacturers of pectin represented that the limits for copper in solid pectin should be in proportion to the strength of the pectin as compared with liquid pectin on the ground that, as the amount of pectin used in foods would be in inverse proportion to the strength of the pectin, the use of solid pectin in lieu of liquid pectin would not result in an increased copper content in the food. Whilst we have felt unable to subscribe to this proposal, we feel, on the evidence at present available, that to impose a limit for the copper content of solid pectin markedly less than 300 p.p.m. might prejudice the production and sale of solid pectin.

(4) *Tea.* The limit of 150 p.p.m. recommended for copper in tea takes account of reports received from the Tea Research Institute for Ceylon on the treatment of a disease known as blister blight, which seriously affects tea estates. Control measures involve the use of copper fungicides and in certain weather conditions it is impossible to avoid

a high degree of contamination. We understand that it may be possible to work to a lower limit when further experience of methods of control has been gained; and consider that the limit of 150 p.p.m. should be regarded as provisional and reviewed periodically. In the meantime we are satisfied that no exception need be taken to the importation of tea containing not more than 150 p.p.m. of copper. Only a fraction of the copper in the leaf is soluble and in view of the proportion which the weight of the infusion bears to the weight of the leaf the copper content of the infusion would not normally exceed the limit of 2 p.p.m. which we have recommended for beverages ready-to-drink.

12. We have not attempted to prescribe limits for composite foods containing one or more of the scheduled foods in addition to foods not scheduled; and recommend instead that where a scheduled food is used in the preparation of any other article of food not being a beverage ready-to-drink, due allowance should be made for the additional amount of copper necessarily introduced by the use of the scheduled food.

13. In view of the high natural copper content of certain animal products, e.g. shell fish and crustacea, offals, etc., we have not proposed specific limits for these articles; we recommend that the sale of such articles containing copper in excess of 20 p.p.m. should be permitted if it can be shown that the copper is of natural occurrence.

14. We have pointed out that from the public health standpoint the presence in foods of traces of copper is a less serious problem than in the case of lead or arsenic. Whilst, therefore, there may be occasion, as with edible gelatin and tomato ketchup, to prescribe statutory limits for a few foods which are peculiarly liable to copper contamination, we consider that, in the absence of any new developments, it is unnecessary to give statutory effect to the limits now recommended. We suggest, however, that the question of imposing comprehensive statutory limits for copper in foods should be kept under review.

20th January, 1956.

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